(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 244 144**
B1

(12) # EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification: **23.01.91**

(51) Int. Cl.[5]: **A 23 L 3/34**, A 23 K 3/00, A 61 K 31/19, A 61 K 31/20, A 61 L 2/00

(21) Application number: **87303488.8**

(22) Date of filing: **21.04.87**

(54) **Antimicrobial preservative compositions.**

(30) Priority: **21.04.86 US 854155**

(43) Date of publication of application:
04.11.87 Bulletin 87/45

(45) Publication of the grant of the patent:
23.01.91 Bulletin 91/04

(84) Designated Contracting States:
DE ES FR GB IT NL

(56) References cited:
CH-A- 641 829
DE-A-2 755 052
GB-A-1 481 961
US-A-4 298 624
US-A-4 406 884

(73) Proprietor: **Kabara, Jon Joseph**
414 Green Street
Galena Illinois 61036 (US)

(72) Inventor: **Kabara, Jon Joseph**
414 Green Street
Galena Illinois 61036 (US)

(74) Representative: **Collier, Jeremy Austin Grey et al**
J.A.Kemp & Co. 14, South Square Gray's Inn
London WC1R 5EU (GB)

EP 0 244 144 B1

Courier Press, Leamington Spa, England.

Description

The present invention relates generally to food grade materials as preservatives and, more particularly, to the addition of glyceryl fatty acid esters, in combination with at least one or more acids selected from the group consisting of C_6—C_{18}, preferably C_6—C_{12}, fatty acids to food compositions, cosmetics or pharmaceutical preparations or the like.

The use of antimicrobial agents plays an important part in current food preservation techniques. However, the addition of these additives has several disadvantages. The addition of antimicrobials may dramatically effect the taste of the food composition. With certain additives, the amount of the additive which may be employed in a food composition may be limited by government regulations. And while many agents are useful in certain environments, certain additives may have a narrow spectrum of microorganism activity and type of foods it may be employed with. Accordingly, there is a need for an antimicrobial that may be added to food compositions which is safe, effective and which overcomes these disadvantages. The present invention meets this need for food, cosmetic and drug preservation.

The prior art teaches several different carboxylic acids which are generally useful in suppressing the growth of fungi, bacteria, molds, and the like such as United States Patent No. 2,154,449 issued to Hoffman et al. teaches the use of aliphatic C_3—C_{12} carboxylic acids and their salts as mold inhibitors in food compositions. United States Patent No. 2,190,714 issued to Hoffman, et al. teaches the addition of a C_3—C_{12} carboxylic acid to inhibit growth food products other than margarine and sourdough bread. United States Patent No. 3,404,987 to Kooistra, et al. teaches an antimicrobial containing edible mineral salt and edible acid preservative substances, particularly propionic acid. United States Patent No. 2,466,663 issued to Russ, et al. teaches the use of a topical or intravenous caprylic acid solution to combat mycotic infections or growths. United States Patent No. 2,729,586 issued to Peck teaches a therapeutic composition having at least one salt of a C_3—C_{11} monocarboxylic acid and water soluble chlorophyll. However, the majority of these are outside the food area. For example, United States Patent No. 4,406,884 issued to Fawzi discloses a topical antimicrobial composition in the form of an aqueous gel or lotion. This composition contains C_5—C_{12} fatty acids having a pH no greater than about 5. United States Patent No. 4,343,798 issued to Fawzi, teaches a topical antimicrobial anti-inflammatory composition having a pH no greater than about 5 and containing C_5—C_{12} fatty acids together with a corticosteroid component. United States Patent No. 4,489,097 issued to Stone, teaches the addition of anti-fungal/antibacterial materials to sterile compositions. The antifungal/antibacterial material disclosed is a C_4—C_9 carboxylate antimicrobial agent having a pH of about 6.0 or below. United States Patent No. 4,410,442 issued to Lucas, et al. teaches solutions for use with hydrophilic soft contact lenses containing C_5—C_{12} fatty acids, especially octanoic acid. United States Patent No. 4,392,848 issued to Lucas, et al. teaches a catheter having a liquid reservoir of an antimicrobial agent flowing through the lumen of the catheter. The antimicrobial agent disclosed is a straight-chain carboxylic acid or carboxylic acid salt having a C_4—C_9 chain. United States Patent No. 4,430,381 issued to Harvey, et al. teaches a process for imparting antimicrobial properties to a material. The antimicrobial being a C_3—C_{12} alkane, alkene or alkyne monocarboxylate. United States Patent Nos. 4,343,788 and 4,479,795, both issued to Mustacich, et al. teach medical polymers that provide diffusion for certain carboxylate antimicrobial agents. United States Patent No. 4,002,775 issued to Kabara teaches a food grade microbicidal composition having a monoester with a C_{12} aliphatic fatty acid as its primary microbicide. United States Patent No. 1,772,975 issued to Weiland teaches the use of lactic acid, acetic acid, or combinations thereof, as antiseptics at properly adjusted pH levels.

Other materials also disclose the use of fatty acids for the suppression of fungi, bacteria, mold and the like. Kabara, J., *Medium-chain Fatty Acids and Esters as Antimicrobial Agents*, Cosmetic and Drug Preservation, Pgs. 275—304, 1984, teaches the use of C_6—C_{22} saturated and unsaturated fatty acids as antimicrobials. Kabara, J., *Toxicological, Bactericidal and Fungicidal Properties of Fatty Acids and Some Derivatives*, The Journal of the American Oil Chemists' Society, Vol. 56, No. 11, pages 760A—767A (1979) teaches the applying of fatty acids to animal skin and eyes. Some fatty acids were found to be skin and eye irritants. Kabara, J., *Inhibition of Staphylococcus Aureus in a Model Agar-Meat System by Monolaurin: A Research Note*, Journal of Food Safety, Vol. 6, pgs. 197—201 (1984), teaches the use of monolaurin as a food preservative to combat microorganisms. Kabara, J., *Antimicrobial Agents Derives from Fatty Acids*, JAOCS, Vol. 61, No. 2, pgs. 397—403 (1984) teaches the use of saturated and unsaturated fatty acids as antimicrobial agents. Kabara, J., *GRAS Antimicrobia Agents for Cosmetic Products*, Journal of the Society of Cosmetic Chemists, Vol. 31, pgs. 1—10 (1980), teaches the composition of monolaurin, a phenol, di-tert-butyl anisole, and a chelating agent such as ethylenediaminetetracetic acid to be useful in destroying gram positive and gram negative bacteria. Schemmel, R., Lynch, P., Krohn, K., and Kabara, J., *Monolaurin as an Anticaries Agent*, teaches the use of glycerol-monolaurin in inhibiting development of smooth surface caries in rats inoculated with Streptococcus mutants. Kabara, Jr., Ohkawa, M., Ikekawa, T., Katori, T., and Mishikawa, Y., *Examination on Antitumor, Immunological and Plant-Growth inhibitory Effects of Monoglycerides of Caprylic, Capric, and Lauric Acids and Related Compounds*, Pharmacological Effects of Lipids, Volume II, pgs. 263—272 (1985) teaches the use of the monoglycerides or caprylic, capric and lauric acids for regulating antitumor, immunological, and plant-growth activity. Li, C., and Kabara, J., *Effects of Lauricidin on Fomes Annosus and Phellinus Weirii*, ACCS Monograph No. 5, pgs. 45—47 (1978) teaches the use of monolaurin in combating root rot fungi in coniferous forest. Kenney, D., *Cosmetic Formulas*

Preserved with Food-Grade Chemicals, Cosmetics and Toiletries, Part 1, Vol. 97, pgs. 71—76 (1982) and Kabara, J., and Wernette, C., *Cosmetic Formulas Preserved with Food-Grade Chemicals*, Cosmetics and Toiletries, Part II, vol. 97, pgs. 77—84 (1982) teaches the use of monoglyceride emulsifier, food-grade phenols and a chelator in the preservation of cosmetics. Kabara, J., *A New Preservative System for Food*, Journal of Food Safety, Volume 4, pgs. 13—25 (1982) teaches the use of monolaurin, a food grade phenolic, and a chelator as an antimicrobial for the preservation of food. Branan, A. and Davison, P. *Antimicrobials in Foods*, Marcel Dekker, New York 1983, pgs. 109—140 teaches the use of saturated, unsaturated and esters of fatty acids as antimicrobials and the use of these compounds for food preservation. Kabara, J., *Fatty Acids and Derivatives as Antimicrobial Agents—A Review*, ACCS Monograph No. 5, pgs. 1—14 (1978) teaches the use of saturated, unsaturated and esters of fatty acids as antimicrobials and the use of these compounds for permeating microorganism cellular membranes for killing the microorganism.

The art also teaches many methods of ethoxylation *Nonionic Surfactants*, Schick, M. J., Marcel Dekker, Inc., New York (1966) and Dillan, K., *Effects of the Ethylene Oxide Distribution on Nonionic Surfactant Properties*, JAOCS, vol. 62, No. 7, pgs. 1144—1151 (1985) teach the ethoxylation of primary alcohols to produce nonionic surfactants.

The above discussion clearly reflects the ambiguous state of the art with regard to the suitability and selection of fatty acid-based materials as food preservatives. The art disclosed materials vary widely in their preservative efficacy and in their spectrum of performance. (The term glyceryl and glycerol are used interchangeably here in when describing fatty acid esters).

The present invention relates to an antimicrobial preservative composition, a method of preserving a food composition, cosmetic or drug by the addition of the preservative and a food composition containing the preservative. The present invention relates to the discovery that the spectrum and speed of activity of both modified and unmodified glyceryl fatty acid esters can be significantly improved when used in a mixture with one or more C_6—C_{18} (preferably C_6—C_{12}) fatty acids. The present invention further relates to the additional discovery that the overall antimicrobial efficacy and acceptability of certain glyceryl fatty acid esters can be dramatically increased by the addition of certain ether groups, particularly ethoxy and propoxy units, either used alone or (when the ethoxylated or propoxylated glycerol fatty acid esters is) used in a ternary combination with a binary mixture of two or more C_6—C_{18} (preferably C_6—C_{12}), fatty acids. Such materials provide effective antimicrobial activity and are accordingly useful in the preservation of food compositions, cosmetics, drugs, and the like where microbial organisms (including viruses) can decrease the shelf life or overall acceptability of the product.

In addition to being useful as pharmaceutical preservatives the present invention has utility in topical pharmaceutical applications. The topical pharmaceutical applications are further discussed in my copending patent application entitled "Topical Antimicrobial Pharmaceutical Compositions, (EP—A—243145).

It has been observed that a combination of a glyceryl fatty acid ester and a mixture of at least one or more acids selected from the group consisting of fatty acids having from about six to about eighteen demonstrates remarkable preservative activity. However, other polyols such as polyglyceryl, sucrose, glucose, sorbitol, and the like sugar esters have been found to work satisfactorily when substituted for the glyceryl fatty acid ester. The useful glyceryl fatty acid esters include those selected from the groups consisting of glyceryl fatty acid esters having from about six to about twenty-one carbon atoms and fatty acids having from about six to about eighteen carbon atoms. The preferred glyceryl fatty acid ester compounds include monocaprylin, monocaprin, monolaurin, monomyristin, monopalmitolein, α-monopalmitin, monostearin, monoolein, 1-monolinolein, 1-monolinolenin, and mixtures thereof. Still more preferred compounds include monocaprylin, monocaprin, monolaurin, monomyristin, monopalmitolein, monoolein, monoicosenoin, and monoerucin and mixtures thereof. The highly preferred compounds include monocaprylin, monocaprin, and monolaurin and mixtures thereof. The preferred first and second fatty acid compounds for use in such combinations are straight chain materials having from about six to about twelve carbon atoms including caproic, heptanoic, caprylic, pelargonic, capric, undecanoic, lauric, myristic, palmitic, heptadecanoic and stearic. The most preferred are caproic, heptanoic, caprylic, capric, undecanoic, and lauric. Highly preferred materials include caproic, caprylic, and capric.

The glyceryl fatty acid esters, first fatty acid, and second fatty acid are added as a preservative to a food compositions, cosmetics, drugs or the like during mixing or manufacturing at a safe and effective level. In a preferred embodiment, they are present in the additive composition at a wt:wt ratio of ester: total fatty acids of about 1:10 to about 10:1; more preferably about 1:10 to about 1:1, and still more preferably about 1:5 to about 1:1 with the ster being present at a level of about 0.025 to 3%; more preferably about 0.025 to 1%, and still more preferably about 0.05 to about 0.5% by weight of the preservative composition or the preserved composition.

It will be appreciated that the preferred levels described above relate to the preparation of an additive composition. The safe and effective level of such components as employed in the final preserved food, cosmetic, drug composition (or the like) vary according to a host of factors including the type of food, the base of the cosmetic, the mode of treatment of the drug, etc., the determination of the final level, i.e., the amount of the preservative composition to be added to the end product, is well within the skill of the artisan. In general, however, the additive compositions of the present invention are added to the final

product at a level of about 0.01 to about 10% to arrive at the preserved food compositions of the present inventions.

It has been further observed that a combination of an ethoxylated/propoxylated glyceryl fatty acid ester and a mixture of at least one or more acids selected from the group consisting of C_6—C_{18}, preferably C_8—C_{12}, fatty acids also demonstrates remarkable preservative activity. Also, other polyols such as polyglyceryl, sucrose, glucose, sorbitol, and the like sugar esters have been found to work satisfactorily when substituted for the glyceryl fatty acid ester. The useful glyceryl fatty acid esters include those selected from the groups consisting of glyceryl fatty acid esters having six to twenty-one, preferably six to fifteen, carbon atoms and fatty acids having six to eighteen carbon atoms. The preferred glyceryl fatty acid ester compounds include monocaprylin, monocaprin, monolaurin, monomyristin, monopalmitolein, α-monopalmitin, monostearin, monolein, 1-monolinolein, 1-monolinolenin, and mixtures thereof. Still more preferred compounds include monocaprylin, monocaprin, monolaurin, monomyristin, monopalmitolein, monoolein, monoicosenoin, and monoerucin and mixtures thereof. The highly preferred compounds include monocaprylin, monocaprin, and monolaurin and mixtures thereof. These materials are modified by the addition of one or more ethoxy/propoxy units as described below prior to being employed in the combination. The preferred first and second fatty acid compounds for use in such combinations are straight chain materials having about six to about 14 carbon atoms including caproic, heptanoic, caprylic, pelargonic, capric, undecanoic, lauric, myristic, palmitic, heptadecanoic and stearic. The most preferred are caproic, heptanoic, caprylic, capric, undecanoic, and lauric. Highly preferred materials include caproic, caprylic, capric, and lauric.

The glyceryl fatty acid esters, first fatty acid, and second fatty acid are added as a preservative to a food composition, cosmetic, drug or the like during mixing or manufacturing. In a preferred embodiment, they are present in the additive composition at a wt:wt ratio of ester: total fatty acids of about 1:10 to about 10:1; more preferably about 1:10 to about 1:1, and still more preferably about 1:5 to about 1:1 with the ethoxylated/propoxylated glyceryl ester being present at a level of about 0.25 to about 3%; more preferably about 0.025 to about 1%; and still more preferably about 0.05% to about 0.5% by weight of the preservative composition or the preserved composition.

The glyceryl fatty acid esters may be ethoxylated or propoxylated under controlled conditions according to conventional methods, such as described below for use in the compositions and methods of the present invention.

It is well known that the ethoxylation or propoxylation of an antimicrobial agent generally renders that agent biologically inactive. See *Nonionic Surfactants*, Martin J. Schick, Marcel Dekker, Inc., New York, New York Chap. 28, pgs. 958—960.

Unexpectedly, it has been found that the addition of a limited number of ethoxy or propoxy units to a glyceryl fatty acid ester results in an antimicrobial agent with good activity. It has been further discovered that the formed narrow range ethoxylates possess better surface-active properties when compared with the broad distribution range adducts. Also, the narrow range ethoxylates seem to act faster and have a better detergent activity than the broad distribution adducts; this faster germicidal and detergent activity does not correlate with what is expected of non-ionic ethoxylates. Generally non-ionic ethoxylates such as Tween 80 and Span 20 are not only germicidally inactive but the former is routinely used to stop germicidal action of chemicals. While not intending to be bound by theory, it appears that controlled ethoxylation or propoxylation adds to available hydroxyl radicals by ring cleavage with regeneration of the hydroxyl group. This reaction is an addition reaction without termination. Such ethoxylation is discussed in more detail in Dillan, K., *Effects of the Ethylene Oxide Distribution of Nonionic Surfactant Properties*, JAOCS, vol. 62, pgs. 1144—1151, 1985, which is herein incorporated by reference.

The glyceryl fatty acid ester which is to be ethoxylated or propoxylated in the practice of the present invention is selected from the group consisting of polyhydric alcohols, polyglycerols, sucrose, glucose, sorbitol, propylenediol and glyceryl fatty acid esters having about six to about twenty-one carbon atoms. The preferred compounds include monocaprylin, monocaprin, monolaurin, monomyristin, monopalmitolein, α-monopalmitin, monostearin, monoolein, 1-monolinolein, 1-monolinolenin, and mixtures thereof. Still more preferred are monocaprylin, monocaprin, monolaurin, monomyristin, monopalmitolein, monoolein, monoicosenin and monoerucin and mixtures thereof. The highly preferred compounds are monocaprylin, monocaprin and monolaurin and mixtures thereof.

The glyceryl fatty acid esters are ethoxylated or propoxylated by conventional ethoxylating or propoxylating compounds. The compounds are preferably selected from the group consisting of ethylene oxide, propylene oxide, mixtures thereof, and similar ringed compounds which provide a material which is effective. Most preferably, the ethoxylation compound is selected from the group consisting of ethylene oxide, propylene oxide and mixtures thereof. Monolaurin is the most preferred.

The glyceryl fatty acid esters are ethoxylated or propoxylated under conventional controlled conditions and techniques to a narrow range according to conventional methods, such as those in the *Dillan* article. The glyceryl fatty acid esters are ethoxylated or propoxylated by a suitable amount of ethoxylate or propoxylate compound. In a preferred embodiment, the ethoxylation or propoxylation compound is reacted at a level of 0.5 to about 20 moles, more preferably, at about 0.5 to about 3.0 moles and, highly preferred, at about 0.5 to about 1.0 moles per mole of the glyceryl ester.

The ethoxylation or propoxylation adds at least one-quarter, and preferably at least about one-half or

more ethoxy or propoxy units per glyceryl fatty acid ester unit. Preferably 0.5 to 6.0, more preferably 0.5 to 3.0 and, still more preferably, 0.5 to 1.0 ethoxy or propoxy units are added per glyceryl fatty acid ester.

Generally, the adduct formed by the reaction of the glyceryl fatty acid ester and ethoxylation or propoxylation compound occurs as described. However, it is noted that the reaction products are complex and may be formed by other well known conventional processes in the chemical art. For example, the ethoxylation of a mixture of glycerol and fatty acids, may yield the same useful products.

The glyceryl fatty acid esters (both ethoxylated/propoxylated and non-ethoxylated/propoxylated), first fatty acid, and second fatty acid may be directly added or admixed with the food composition, cosmetics, drugs, or the like during the manufacturing process. However, conventional food-grade carriers may be employed when an additive composition is prepared. Food grade carriers selected from the group consisting of alcohols, propylene glycol, phenoxyethanol, ethanol, and mixtures thereof may be employed in such additive compositions.

Preferred carriers include propylene glycol, ethanol, and mixtures thereof. These carriers enhance the mixing of the elements.

Water may also be used q.s. to form the remainder of the carrier and may be selected from the group consisting of distilled water, deionized water, tap and well water.

The alcohols are employed in the compositions of the present invention at any suitable level. In a preferred embodiment they are present at a level of about 5 to 60%, more preferred at about 10 to 30% and, highly preferred, at about 20 to 25% weight per volume of solution.

Water is employed in solution as the remainder of the solution.

The following Examples illustrate the invention.

Example 1

The following formula has been found to be active against a group of organism when added to a food composition.

Glycerol monolaurin	0.05—.5%
Caprylic acid/capric acid mixture	0.05—.5%
Propylene glycol	10—30%
Water	69—89.9%

The above formula is effective against yeasts, fungii, gram negative and gram positive organism.

The critical components of the compositions of the present invention are added individually (glyceryl ester; first fatty acid; second fatty acid) directly into the food composition, cosmetics, drugs, or the like during the manufacturing processing in any convenient order. After addition of the components, the substances are mixed thoroughly so as to uniformly distribute the composition throughout the substance. Once the composition is uniformly distributed in the substance, the substance will be enhanced with antimicrobial properties. However, a composition of the present invention may be prepared as an additive composition prior to addition to the final preserved food, cosmetic, drug, etc. The additive is then added directly to the food, drug or the like.

Example 2

A powder cheddar cheese was supplied by SeaFla, Inc. 2.5% grams of the powder cheddar cheese was mixed with 10 ml of tap water at about 23°C. The resulting mixture had a smooth consistency. The following components were added and mixed into the cheese sauce in the concentrations as listed in Table 1 to form a preserved food composition according to the present invention.

TABLE 1

	% Concentration with respect to total gram weight of the mixture
3 Parts glycerol monolaurin	0.05—.5%
7 Parts caprylic acid/capric acid mixture (6:4)	0.05—.5%

The following organisms were identified in the cheese sauce at the conception of the experiment; Leuconostoc, Staphlococcus, Lactobacillus, Bacillus (all gram positive) and Mucor (a fungus). These organisms were present at a level of approximately 2.0×10^3 colony forming units/gram (CFU/gram) in all samples.

Several cheese sauce samples were incubated at room temperature, while other samples were incubated at approximately 37°C, both were checked daily for spoilage.

A control sample not of the present invention spoiled in 8 days (at room temperature) and 5 days (at elevated temperatures 37°C). The sauce was considered to be spoiled when CFU/gram=Log_{10} 5—6 CFU/gram. Table 2 contains the results of the samples tested.

TABLE 2
Effect on shelf-life of a cheese sauce

Concentration of glycerol monolaurin & C_8/C_{10} fatty acid with respect total gram weight of the mixture	Number of days before spoilage occurred at specified incubation temperatures	
	Room temperature	37°C
0.0%	8 days	5 days
0.05%	34 days	34 days
0.10%	34 days	34 days
0.20%	>6 weeks	>6 weeks

The experiment was stopped after 7 weeks and the samples having 0.20% concentrations were considered preservative up to this point.

Claims for the Contracting States: DE, FR, GB, IT, NL

1. An antimicrobial preservative composition comprising:
(a) a glyceryl fatty acid ester or an ethoxylated or propoxylated glyceryl fatty acid ester;
(b) a mixture of fatty acids comprising:
(i) a first antimicrobial fatty acid containing 6 to 18 carbon atoms; and
(ii) a second antimicrobial fatty acid containing 6 to 18 carbon atoms wherein the second fatty acid is different from the first fatty acid; and
(c) a carrier.

2. An antimicrobial preservative composition according to Claim 1 wherein the glyceryl fatty acid ester has been reacted with 0.5 to 3 moles of ethoxylating or propoxylating compound per mole of glyceryl ester.

3. An antimicrobial preservative composition according to Claim 1 or 2 wherein the glyceryl fatty acid ester is a monoester.

4. An antimicrobial preservative composition according to Claim 3 wherein the monoester contains 6 to 21 carbon atoms.

5. An antimicrobial preservative composition according to Claim 4 wherein the monoester is monocaprylin, monocaprin, monolaurin, monomyristin, monopalmitolein, monolein or a mixture thereof.

6. An antimicrobial preservative composition according to any one of Claims 3 to 5 wherein the monoester is present in an amount of 0.025 to 3 percent by weight of the composition.

7. An antimicrobial preservative composition according to any one of Claims 1 to 6 wherein the first and second fatty acids are each straight chain fatty acids containing 6 to 12 carbon atoms.

8. An antimicrobial preservative composition according to any one of Claims 1 to 7 wherein the ratio by weight of the monoester to the combined fatty acids is 1:5 to 1:1.

9. An antimicrobial preservative composition according to any one of Claims 1 to 8 wherein the carrier comprises propylene glycol and water.

10. A method of preserving a food composition, cosmetic or drug to improve its shelf life which comprises adding thereto an antimicrobial preservative composition according to any one of Claims 1 to 9.

11. A shelf-stable food composition which contains an antimicrobial preservative composition as claimed in any one of Claims 1 to 9.

Claims for the Contracting State: ES

1. A process for preparing an antimicrobial preservative composition which comprises mixing together:
(a) a glyceryl fatty acid ester or an ethoxylated or propoxylated glyceryl fatty acid ester;
(b) a mixture of fatty acids comprising:
(i) a first fatty acid antimicrobial agent comprising 6 to 18 carbon atoms; and
(ii) a second fatty acid antimicrobial agent comprising 6 to 18 carbon atoms wherein said second fatty acid is different from said first fatty acid; and
(c) a carrier.

2. A process according to Claim 1 wehrein the glyceryl fatty acid ester has been reacted with 0.5 to 3 moles of ethoxylating or propoxylating compound per mole of glyceryl ester.

3. A process according to Claim 1 or 2 wherein the glyceryl fatty acid ester is a monoester.

4. A process according to Claim 3 wherein the monoester contains 6 to 21 carbon atoms.

5. A process according to Claim 4 wherein the monoester is monocaprylin, monocaprin, monolaurin, monomyristin, monopalmitolein, monolein or a mixture thereof.

6. A process according to any one of Claims 3 to 5 wherein the monoester is present in an amount of 0.025 to 3 percent by weight of the composition.

7. A process according to any one of Claims 1 to 6 wherein the first and second fatty acids are each straight chain fatty acids containing 6 to 12 carbon atoms.

8. A process according to any one of Claims 1 to 7 wherein the ratio by weight of the monoester to the combined fatty acids is 1:5 to 1:1.

9. A process according to any one of Claims 1 to 8 wherein the carrier comprises propylene glycol and water.

10. A method of preserving a food composition, cosmetic or drug to improve its shelf life which comprises adding thereto an antimicrobial preservative composition according to any one of Claims 1 to 9.

11. A shelf-stable food composition which contains an antimicrobial preservative composition as claimed in any one of Claims 1 to 9.

Patentansprüche für die Vertragsstaaten: DE, FR, GB, IT, NL

1. Eine antimikrobielle konservierende Zusammensetzung, enthaltend:
(a) einen Glycerylfettsäureester oder einen ethoxylierten oder propoxylierten Glycerylfettsäureester;
(b) eine Mischung von Fettsäuren, die
(i) eine erste antimikrobielle Fettsäure mit 6 bis 18 Kohlenstoffatomen und
(ii) eine zweite antimikrobielle Fettsäure mit 6 bis 18 Kohlenstoffatomen enthält, wobei die zweite Fettsäure von der ersten Fettsäure verschieden ist, und
(c) einen Träger.

2. Eine antimikrobielle konservierende Zusammensetzung nach Anspruch 1, in der der Glycerylfettsäureester umgesetzt ist mit 0,5 bis 3 Molen einer ethoxylierenden oder propoxylierenden Verbindung je Mol Glycerylester.

3. Eine antimikrobielle konservierende Zusammensetzung nach den Ansprüchen 1 oder 2, in der der Glycerylfettsäureester ein Monoester ist.

4. Eine antimikrobielle konservierende Zusammensetzung nach Anspruch 3, in der der Monoester 6 bis 21 Kohlenstoffatome enthält.

5. Eine antimikrobielle konservierende Zusammensetzung nach Anspruch 4, in der der Monoester Monocaprylin, Monocaprin, Monolaurin, Monomyristin, Monopalmitolein, Monolein oder eine Mischung derselben ist.

6. Eine antimikrobielle konservierende Zusammensetzung nach jeglichem der Ansprüche 3 bis 5, in der der Monoester in einer Menge von 0,025 bis 3 Gew.%, bezogen auf die Zusammensetzung, vorhanden ist.

7. Eine antimikrobielle konservierende Zusammensetzung nach jeglichem der Ansprüche 1 bis 6, in der die erste und die zweite Fettsäure jeweils geradkettige Fettsäuren mit 6 bis 12 Kohlenstoffatomen sind.

8. Eine antimikrobielle konservierende Zusammensetzung nach jeglichem der Ansprüche 1 bis 7, in der das Gewichtsverhältnis des Monoesters zu den kombinierten Fettsäuren 1:5 bis 1:1 beträgt.

9. Eine antimikrobielle konservierende Zusammensetzung nach jeglichem der Ansprüche 1 bis 8, in der der Träger Propylenglykol und Wasser umfaßt.

10. Verfahren zum Konservieren einer Lebensmittelzusammensetzung, eines Kosmetikums oder eines Arzneimittels zur Verbesserung von deren Lagerfähigkeit, dadurch gekennzeichnet, daß man diesem eine antimikrobielle konservierende Zusammensetzung nach jeglichem der Ansprüche 1 bis 9 zusetzt.

11. Eine lagerstabile Nahrungsmittelzusammensetzung, welche eine antimikrobielle konservierende Zusammensetzung nach jeglichem der Ansprüche 1 bis 9 enthält.

Patentansprüche für den Mitgliedsstaat: ES

1. Verfahren zum Herstellen einer antimikrobiellen konservierenden Zusammensetzung, dadurch gekennzeichnet, daß man
(a) einen Glycerylfettsäureester oder einen ethoxylierten oder propoxylierten Glycerylfettsäureester;
(b) eine Mischung von Fettsäuren, die
(i) eine erste antimikrobielle Fettsäure mit 6 bis 18 Kohlenstoffatomen und
(ii) eine zweite antimikrobielle Fettsäure mit 6 bis 18 Kohlenstoffatomen enthält, wobei die zweite Fettsäure von der ersten Fettsäure verschieden ist, und
(c) einen Träger miteinander vermischt.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß der Glycerylfettsäureester umgesetzt ist mit 0,5 bis 3 Molen einer ethoxylierenden oder propoxylierenden Verbindung je Mol Glycerylester.

3. Verfahren nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß der Glycerylfettsäureester ein Monoester ist.

4. Verfahren nach Anspruch 3, dadurch gekennzeichnet, daß der Monoester 6 bis 21 Kohlenstoffatome enthält.

5. Verfahren nach Anspruch 4, dadurch gekennzeichnet, daß der Monoester Monocaprylin, Monocaprin, Monolauryin, Monomyristin, Monopalmitolein, Monolein oder eine Mischung derselben ist.

6. Verfahren nach jeglichem der Ansprüche 3 bis 5, dadurch gekennzeichnet, daß der Monoester in einer Menge von 0,025 bis 3 Gew.%, bezogen auf die Zusammensetzung, vorhanden ist.

7. Verfahren nach jeglichem der Ansprüche 1 bis 6, dadurch gekennzeichnet, daß die erste und zweite

Fettsäure jeweils geradkettige Fettsäuren mit 6 bis 12 Kohlenstoffatomen sind.

8. Verfahren nach jeglichem der Ansprüche 1 bis 7, dadurch gekennzeichnet, daß das Gewichtsverhältnis des Monoesters zu den kombinierten Fettsäuren 1:5 bis 1:1 beträgt.

9. Verfahren nach jeglichem der Ansprüche 1 bis 8, dadurch gekennzeichnet, daß der Träger Propylenglykol und Wasser umfaßt.

10. Verfahren zum Konservieren einer Lebensmittelzusammensetzung, eines Kosmetikums oder eines Arzneimittels zur Verbesserung von deren Lagerfähigkeit, dadurch gekennzeichnet, daß man diesem eine antimikrobielle konservierende Zusammensetzung nach jeglichem der Ansprüche 1 bis 9 zusetzt.

11. Eine lagerstabile Nahrungsmittelzusammensetzung, welche eine antimikrobielle konservierende Zusammensetzung nach jeglichem der Ansprüche 1 bis 9 enthält.

Revendications pour les Etats Contractants: DE, FR, GB, IT, NL

1. Composition antimicrobienne conservatrice comprenant:
a) un ester d'acide gras du glycéryle ou un ester d'acide gras du glycéryle éthoxylé ou propoxylé;
b) un mélange d'acides gras comprenant:
(i) un premier acide gras antimicrobien contenant de 6 à 18 atomes de carbone; et
(ii) un second acide gras antimicrobien contenant de 6 à 18 atomes de carbone, le second acide étant différent du premier acide gras; et
c) un véhicule.

2. Composition antimicrobienne conservatrice selon la revendication 1 où l'ester d'acide gras du glycéryle a réagi avec 0,5 à 3 moles de composé éthoxylant ou propoxylant par mole d'ester du glycéryle.

3. Composition antimicrobienne conservatrice selon la revendication 1 ou 2 où l'ester d'acide gras du glycéryle est un monoester.

4. Composition antimicrobienne conservatrice selon la revendication 3 où le monoester contient de 6 à 21 atomes de carbone.

5. Composition antimicrobienne conservatrice selon la revendication 4 où le monoester est une monocapryline, une monocaprine, une monolaurine, une monomyristine, une monopalmitoléïne, une monooléïne ou leur mélange.

6. Composition antimicrobienne conservatrice selon l'une quelconque des revendications 3 à 5 où le monoester est présent en une quantité de 0,025 à 3% en poids du poids de la composition.

7. Composition antimicrobienne conservatrice selon l'une quelconque des revendications 1 à 6 où le de premier et le second acides gras sont tous deux des acides gras à chaîne droite contenant de 6 à 12 atomes de carbone.

8. Composition antimicrobienne conservatrice selon l'une quelconque des revendications 1 à 7 ou le rapport en poids du monoester aux acides gras combinés est de 1:5 à 1:1.

9. Composition antimicrobienne conservatrice selon l'une quelconque des revendications 1 à 8 où le véhicule comprend le propylène glycol et l'eau.

10. Procédé de conservation d'une composition alimentaire, d'une composition cosmétique ou d'un médicament, destiné à améliorer la durée de conservation, comprenant l'addition à cette composition d'une composition antimicrobienne conservatrice selon l'une quelconque des revendications 1 à 9.

11. Composition alimentaire stable à la conservation contenant une composition antimicrobienne conservatrice selon l'une quelconque des revendications 5 à 9.

Revendications pour l'etat Contractant: ES

1. Procédé de préparation d'une composition antimicrobienne conservatrice consistant à mélanger ensemble:
a) un ester d'acide gras du glycéryle ou un ester d'acide gras du glycéryle éthoxylé ou propoxylé;
b) un mélange d'acide gras comprenant:
(i) un premier acide gras antimicrobien, contenant de 6 à 18 atomes de carbone; et
(ii) un second acide gras antimicrobien, contenant de 6 à 18 atomes de carbone, le second acide gras étant différent du premier acide gras; et
c) un véhicule.

2. Procédé selon la revendication 1 où l'ester d'acide gras du glycéryle a réagir avec 0,5 à 3 moles d'un composé éthoxylant ou propoxylant par mole d'ester du glycéryle.

3. Procédé selon la revendication 1 ou 2 où l'ester d'acide gras du glycéryle est un monoester.

4. Procédé selon la revendication 3 où le monoester contient de 6 à 21 atomes de carbone.

5. Procédé selon la revendication 4 où le monoester est une monocapryline, une monocaprine, une monolaurine, une monomyristine, une monopalmitoléïne, une monooléïne ou leur mélange.

6. Procédé selon l'une quelconque des revendications 3 à 5 où le monoester est présent en une quantité de 0,025 à 3% en poids du poids de la composition.

7. Procédé selon l'une quelconque des revendications 1 à 6 où le de premier et le second acides gras sont chacun des acides gras à chaîne droite contenant de 6 à 12 atomes de carbone.

8. Procédé selon l'une quelconque des revendications 1 à 7 où le rapport en poids du monoester aux acides gras combinés est de 1:5 à 1:1.

9. Procédé selon l'une quelconque des revendications 1 à 8 où le véhicule comprend le propylène glycol et l'eau.

10. Procédé de conservation d'une composition alimentaire, d'une composition cosmétique ou d'un médicament destiné à améliorer la durée de conservation, comprenant l'addition à cette composition d'une composition antimicrobienne conservatrice selon l'une quelconque des revendications 1 à 9.

11. Composition alimentaire stable à la conservation qui contient une composition antimicrobienne conservatrice selon l'une quelconque des revendications 1 à 9.